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The Effect of Puzzle-Based Learning on Secondary School Students' Attitudes and Their Self-Efficacy Beliefs in English Lesson*

Bulmaca Temelli Öğrenme Yaklaşımının Ortaokul Öğrencilerinin İngilizce Dersine Yönelik Tutumlarına ve Öz-Yeterlik İnançlarına Etkisi

Özgür Kürşad DERER** **Hasan Güner BERKANT*****

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ABSTRACT: The overall aim of this research was to examine the effectiveness of puzzle-based learning approach on secondary school students' attitudes and their self-efficacy beliefs in English lesson. The research employed the mixed model and quasi-experimental design with pre-test/post-test was applied. The working group was consisted of the 8th grade students who were selected from two classes and who learned at Elbistan Secondary School during the 2017-2018 academic year. The study was conducted with two groups; experimental group and control group. While lessons were taught based on puzzle-based learning approach in experimental group, in control group the lessons were taught according to the suggested methods of English lesson curriculum. At the end of the study, experimental group students' attitudes and self-efficacy beliefs in English lesson scores increased within groups and between groups. The activities which were carried out in the context of puzzle-based learning were considered as effective applications by students. Observations done during the implementation process of puzzle-based learning in experimental group revealed that the students had fun and learned, and their active participation increased during lessons.

Keywords: English lesson, puzzle-based learning, attitude toward English, self-efficacy beliefs in English.

ÖZ: Bu araştırmanın genel amacı, bulmaca temelli öğrenme yaklaşımının ortaokul sekizinci sınıf öğrencilerinin İngilizce dersine yönelik tutum ve İngilizce öz-yeterlik inançlarına etkisini belirlemektir. Çalışmada hem nicel hem de nitel verilerin birlikte yer aldığı karma model kullanılmış ve deneysel desen olarak öntest-sontest kontrol gruplu yarı deneysel desen tercih edilmiştir. Çalışma grubu, 2017- 2018 eğitim-öğretim yılında Kahramanmaraş ili Elbistan ilçesindeki bir ortaokulun iki şubesindeki sekizinci sınıf öğrencilerinden oluşmaktadır. Araştırma, biri deney grubu diğeri kontrol grubu olmak üzere iki grupla uygulanmıştır. Deney grubunda dersler bulmaca temelli öğrenme yaklaşımına göre işlenirken, kontrol grubunda dersler İngilizce dersi öğretim programın öngördüğü yöntemlere dayalı olarak işlenmiştir. Çalışmanın sonucunda, bulmaca temelli öğrenme yaklaşımının uygulandığı deney grubu öğrencilerinin grup içinde ve gruplar arasında İngilizce dersine yönelik tutumlarının ve İngilizce öz-yeterlik inançlarının olumlu yönde arttığı ortaya çıkmıştır. Bulmaca temelli öğrenme bağlamında gerçekleştirilen etkinlikler, öğrenciler tarafından etkili uygulamalar olarak değerlendirilmiştir. Deney grubunda uygulama sürecinde yapılan gözlemler sonucunda bulmaca temelli öğrenme etkinlikleri aracılığıyla öğrencilerin eğlenip öğrendikleri ve derslerde aktif katılımlarının arttığı görülmüştür.

Anahtar kelimeler: İngilizce dersi, bulmaca temelli öğrenme, İngilizce dersine yönelik tutum, İngilizce öz-yeterlik inancı.

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** PhD student, Anadolu University, Eskişehir, Turkey, ok.derer@outlook.com.tr, https://orcid.org/0000-0002-2383-5540
***Corresponding Author: Prof. Dr., Bozok University, Yozgat, Turkey, hgberkant@gmail.com, https://orcid.org/0000-0003-0725-6036

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Introduction

Language plays an important role in communication. Among the most used languages, English is regarded as global common language used by people with different native languages. For this reason, many countries emphasize the importance of learning English to their citizens. As a foreign language, English is considered as being in the first foreign language position in Turkey. In Turkey, students do not learn English in natural environment, so it is common that they have experienced a great number of difficulties during foreign language learning process. Various reasons may lead most of Turkish students to think that studying English is a waste of time and effort. When individuals cannot understand English grammar, vocabulary, expressions, etc., they may easily lose their motivation to learn English and this situation may cause failure in language teaching and learning process. At this point, one of the leading factors that plays a significant role in students' academic and English learning success is how individuals perceive English. Thus, it is of great importance to explore the students' attitudes toward English as a foreign language, their English self-efficacy beliefs and how their attitudes and self-efficacy beliefs affect their progress in learning English. Individuals' characteristics may vary due to their past experiences, psychological structures and socio-economic environment in which they grow. Thus, individuals' attitudes toward foreign languages and self-efficacy beliefs should be taken into account in the process of foreign language learning. Various teaching methods and techniques are utilized in order to provide positive developments for their characteristics during the process of learning a foreign language. In recent years, there has been a shift from teacher-centered traditional classes to learner-centered teaching environment in which learners are responsible for their learning processes and teachers serve as a guide and facilitator (Atkinson, 2003). In this context, the use of puzzles in the foreign language teaching process is considered as a tool that allows teachers to juice up the learning environment and class activities and to make students alive by creating difficulties and fun at the same time (Aziza, 2013; Vaishnav, 2015). Puzzle-based learning is a fundamental approach to develop thinking skills. This approach aims to encourage students to think about how to solve problems. The aim is also to motivate students and improve problem-solving skills by discussing various puzzles and solution strategies (Meyer, Falkner, Sooriamurthi, & Michalewicz, 2014). According to Michalewicz and Michalewicz (2008), the features of puzzle-based learning are as follows:

- Learning is carried out with challenging, open-ended problems.
- Students work in small collaborative learning groups.
- The teacher takes the role of "facilitator" of learning process.

The puzzle-based learning approach can be easily applied to all levels of education and different courses and the studies about puzzle-based learning have been carried out in mathematics, engineering, language teaching, biology, etc. The use of puzzles enhances both students' problem-solving skills and their abilities to think critically; moreover, it increases the students' participation in the classroom (Öztürk & Gök, 2015). There are two main reasons why puzzle-based learning should be included in curricula:

- Puzzles are autotelic, in other words, they have their own goals without being related to anything else, and they are naturally fun (Öztürk & Gök, 2015). As Danesi (2004) stated, we as humans have an eager spirit to solve puzzles. The

puzzle instinct is at the core of human nature, like humour, language, art, music and other creative factors that distinguish humanity from all other species. Exploring puzzles is natural for those who want to experience tension and pleasure in understanding events. A learning situation based on puzzle-based learning is designed to help the learner experience this wonderful experience.

- Puzzles are, naturally, tools that can be used to develop competencies such as independent reasoning and critical thinking that can form the basis for students' problem-solving skills as they are fun and impressive. Puzzle-based learning is rapidly becoming a major part of curricula, as there is no guarantee that traditional education will provide students with sufficient practice and experience to improve problem-solving skills (Meyer et al., 2014).

The use of puzzles in foreign language classes has various benefits such as vocabulary, correct use of spelling and punctuation, less threatening classroom environment, recall of information and memory, and motivation of students (Aziza, 2013; Bouteliaten, 2010; Fadel, 2005). These are explained as follows:

Motivation: Most language teachers are of the view that students' motivation is one of the most significant factors affecting the success or failure of learning English. In other words, motivation directs the student toward success. Slavin (2003) considers motivation as one of the most important elements of effective teaching. It is generally accepted that some students are better than others when learning a language and this situation is often related to motivation rather than intelligence. Also, Slavin (2003) notes that it is teachers' job to provide motivation for students and to engage in activities that encourage them to learn. Thus, puzzles can help to achieve the goal in foreign language classes, especially in vocabulary learning. So, puzzles can provide students with the necessary warning that they should make more efforts to learn a language (Fadel, 2005).

Vocabulary: In order to be able to perform any puzzle activity, students must have the ability to identify and understand the idiom, the word, and this can be done by acquiring new vocabulary items. Therefore, after doing a lot of puzzle activities, students will learn some words and phrases they did not know before, and this usually gives them the chance to win new vocabulary. Students can use new words in speaking and writing activities and influence their teachers. By this way, confidence of the students may increase (Aziza, 2013; Bouteliaten, 2010).

Proper writing and spelling: A student trying to solve a puzzle activity must first understand the tips that lead him/her to answers. If the student cannot answer a specific puzzle question, then he/she can use dictionary to get the right answer and learn the exact spelling. This will enable student to develop the skills and competencies needed to practice writing, spelling, pronunciation, and even word recognition (Aziza, 2013; Bouteliaten, 2010).

Less threatening classroom environment: Another benefit of using puzzles in teaching environments is that for students who solve test questions, try to cope with challenging assignments, learn to deal with different lessons, puzzles are more entertaining and playful, and this makes classroom environment more comfortable and less threatening for the student (Aziza, 2013; Bouteliaten, 2010).

Remembering information: Teachers can easily create puzzles about their lessons and topics in a short time. If they create specific puzzles for the lesson, students

can more easily recall the information and recall it to memory (Aziza, 2013; Bouteliaten, 2010).

The following studies may be encountered in literature related to the use of puzzle-based learning. Crossman and Crossman (1983) aimed to determine the benefits of using puzzles in teaching environments and found out that puzzles provided an entertaining environment for learning. Franklin, Peat, and Lewis (2003) applied research about the use of games and puzzles to determine whether 1st grade biology students were benefiting from learning card games and puzzles in class. The students stated the contribution of using the games and puzzles to active learning, repetition, and entertaining environment. Akkan (2005) investigated the effectiveness of puzzles on academic achievement of primary school students in mathematics courses and found out its positive effectiveness compared to traditional teaching methods. Songur (2006) studied the effects of mathematics course with game and puzzles on achievement and retention levels of 8th grade primary school students and determined positive effects of this method on these variables. Weisskirch (2006) examined the effect of puzzle activities on repetition of the subjects and students declared that this method was more interesting, effective, and entertaining compared to traditional methods. Nassar (2009) aimed to reveal the effect of the use of puzzles in the development of critical thinking and academic achievement in mathematics and proved the effects of puzzles on these variables. Vossoughi and Zargar (2009) found out the positive effect of word puzzles on students' vocabulary development. Alemi (2010) determined the contribution of vocabulary games and puzzles to students' vocabulary. Bouteliaten (2010) determined the effectiveness of using puzzles as an instructional technique to improve the knowledge of English learners about new foreign vocabulary items. Merrick (2010) studied the adaptation of puzzle-based learning to introduction of a computer programming lesson and identified the contribution of this adaptation to the increase of students' interest and critical thinking skills. Sholikhah (2011) determined the influence of puzzle activities in increasing the vocabulary of commonly used words of 5th grade students. Gürdal and Arslan (2011) tried to explain Turkish vocabulary teaching methods to foreigners through game and puzzle activities and ascertained positive effect of these activities on students' interests and learning experiences. Aslan (2012) presented the activities about how to use the puzzle technique in "Ataturkism" unit and specified the effect of puzzle activities on students' concept learning situations. Aydemir (2012) found out the positive effects of online puzzles on the retention of 10th grade students of vocational high schools. Chen, Lin, Looi, Shao, and Chan (2012) showed the development of arithmetic skills through puzzle games played with cooperation. Kaymakçı (2012) specified the effect of puzzles on the increase of students' active participation in social studies lessons. Öztürk, Gök, and Takımcıgil (2013) aimed to present the theoretical foundations, application areas, and sample-finding activities of puzzle-based learning approach and to raise awareness about the qualities of puzzles by making a literature search related to puzzle-based learning. Kestha and Al-Faalet (2013) determined the effectiveness of puzzle-based learning on the development of 10th grade students' vocabulary. Aziza (2013) identified positive role of puzzles in improving vocabulary by learning new words. Njoroge, Ndung'u, and Gathigia (2013) determined the impact of puzzle-based learning on development of students' vocabulary in foreign language classes. Orawiwatnakul (2013) found out the positive effects of puzzles on

students' vocabulary and their motivations. Kızıl (2015) aimed at revealing the impact of concept puzzle activities on academic achievement in social studies lesson of 6th grade students. Namlı (2016) aimed to determine the influence of Sudoku, Futoshiki and Kakuro on 8th grade students' academic achievements and attitudes toward mathematics lesson.

The following studies have important results regarding self-efficacy in learning foreign language: Huang and Shanmao (1996) examined the relationship between self-efficacy and academic achievement of English as a second language and determined a significant relationship between self-efficacy and academic achievement variables. Çubukçu (2008) aimed to reveal the relationship between the level of anxiety and self-efficacy beliefs of students studied in foreign language department and didn't find any significant relationship between these variables. Tılfarlıoğlu and Cinkara (2009) investigated foreign language self-efficacy levels of university students studying foreign language teaching and found out their high-level self-efficacy levels during the process of learning English. Anaydubalu (2010) indicated the positive relationship between students' self-efficacy and their performance in English learning. Başaran (2010) found out the change of language learning judgments and self-efficacy beliefs of university students who learn English as a foreign language depending on their use of the podcasts as a language learning tool. Motlagh, Amrai, Yazdani, Abderahim, and Souri (2011) revealed the positive relationship between students' self-efficacy perceptions and their academic achievements. Meral, Çolak, and Zereyak (2012) determined the significant effect of self-efficacy on students' academic performances. Raoofi, Tan, and Chan (2012) specified positive relationships between students' self-efficacy beliefs and their interests in learning foreign language. Gömleksiz and Kılınç (2014) determined that 12th grade students were at medium level related to English self-efficacy beliefs. Memduhoğlu and Çelik (2015) determined that self-efficacy perceptions of prospective teachers were approximately at medium level. Yangın Ersanlı (2015) examined the relationship between academic self-efficacy levels and language learning motivations of the 8th grade students.

The attitudes toward foreign language have been taken into account in the following studies: Yang and Lau (2003) conducted a study to reveal the attitudes of higher education students toward English and the data emphasized the importance of this attitude about the use of English. Baş (2009) studied the effects of cooperative learning and traditional foreign language teaching methods on students' attitudes toward English lesson and retention of their achieved knowledge and found out its positive effects on these variables. Kılıç (2009) aimed to reveal the effect of creative drama method on students' English speaking skills and attitudes toward speaking English and determined the contribution of drama. Baş (2010) analyzed the positive effects of brain-based learning method on students' achievement levels and their attitudes toward the lesson in the 6th grade English lesson. Çimen (2011) specified significant correlations between attitudes of university students toward English and their self-efficacy perceptions. Çolak (2013) found out the positive effects of English communication activities organized in Second Life program on foreign language self-efficacy beliefs and social presence of Computer Education and Instructional Technology students who studied distance education. Doğru (2014) tried to find out the effect of guided imagery activities on university students' attitudes related to English lessons. Kartal (2014)

demonstrated the effect of English course applied by cooperative learning method on university students' foreign language attitudes. On the other hand, in Avcı's (2015) study the station technique didn't affect students' attitudes toward English lesson. Akın (2016) investigated the effect of creative drama method on high school students' reflective thinking skills and attitudes toward English lesson. Şahin (2016) specified the positive effect of teaching English through stories on students' reading comprehension skills, vocabulary, and their attitudes toward English lesson.

Unlike the aforementioned studies, this study explored the effect of puzzle-based learning both on students' attitudes toward English lesson and their self-efficacy beliefs in English together through using quantitative and qualitative data. In this regard, the problem statement was determined as "What is the effect of puzzle-based learning approach on secondary school students' attitudes and their self-efficacy beliefs in English lesson?"

Aim of the Research

The overall aim of this research was to explore the effect of the puzzle-based learning approach on secondary school students' attitudes and their self-efficacy beliefs in English lesson. In accordance with this main aim, answers to the following questions were sought:

1. Is there a significant difference between pre-test and post-test scores of the students' attitudes and their self-efficacy beliefs in English lesson within experimental group based on puzzle-based learning approach?
2. Is there a significant difference between pre-test and post-test scores of the students' attitudes and their self-efficacy beliefs in English lesson within control group in which proposed teaching methods of English lesson curriculum were applied?
3. Is there a significant difference between experimental group based on puzzle-based learning approach and control group in which proposed teaching methods of English lesson curriculum were applied in terms of post-test scores of students' attitudes and their self-efficacy beliefs in English lesson?
4. Is there a significant relationship between students' attitudes toward English lesson scores and their English self-efficacy belief scores?
5. What are the students' opinions in relation with puzzle-based learning activities?
6. What are the students' observed behaviors in English classroom in which the puzzle-based learning approach is used?

Methodology

Research Design

This research employed mixed method, which is expressed as a research method that involves collecting and analyzing together or consecutively the qualitative and quantitative data in the same research (Creswell, Plano Clark, Gutmann, & Hanson, 2003). Students' attitudes and self-efficacies were measured by qualitative research methods, and observation and interviews were also made as qualitative research methods to obtain the detailed and depth data from working group. The quantitative dimension of the study was conducted depending on the pre-test-post-test control group

+pattern which was based on quasi-experimental design. In qualitative dimension, semi-structured interviews and unstructured observation method were used.

Participants

The study group included 8-K and 8-I classes who were studying in a secondary school in Elbistan province of Kahramanmaraş in 2017-2018 academic years. As the study was carried out in a school in which one of the researchers was working, the convenience sampling model was used in grouping experimental and control groups (Yıldırım & Şimşek, 2018). The sample consisted of 51 students (27 students in experimental group and 24 students in control group). In order to select the experimental and control groups in a balanced manner before the study, attitude scale for the English course and the English self-efficacy scale were applied to the students studying in the 8-I-İ-K-L classes as pre-tests. According to pre-test scores, two groups which had no differences between them were chosen. Pre-test scores showed that, there was no significant difference between students' attitudes toward English lesson [$t(49)=1.1$, $p>.05$] and between their self-efficacy beliefs in English [$t(49) =.40$, $p>.05$].

Teaching-Learning Processes in Experimental Group

Teaching-learning process in experimental group of the research was organized in accordance with puzzle-based learning approach. English courses were conducted with 27 students in the first and second semester of 2017-2018 academic years in "Cooking, Communication, Internet and Adventures" units. Experimental process lasted 15 weeks and for this period fifteen lesson plans were prepared in accordance with puzzle-based activities. Several examples of puzzles used in research were presented in Appendix. In lesson plans, at least two puzzle activities for each of four course hour were applied to students. During applications, the researcher was a guide and provided feedback and corrections to the students when needed. Thanks to frequency of application of puzzle activities, learning of students was reinforced. In puzzle activities, students were at the centre of learning process and were responsible for their own learning.

Teaching-Learning Processes in Control Group

The lessons including "Cooking, Communication, Internet and Adventures" units in the control group were processed by the instructor of the course for 15 weeks. The teacher of control group used the textbook as a main resource within the scope of the 8th grade English curriculum and studied the lessons depending on the acquisitions in the guidance of teacher guidebook.

Data Collection Tools

The research deployed *Attitude Scale toward English Lesson* (Erdem, 2007), *Self-Efficacy Belief Scale for English* (Hancı Yanar & Bümen, 2012), *Interview Form* and *Observation Form* developed by researchers as data collection tools.

Attitude Scale toward English Lesson developed by Erdem (2007) was used to measure the attitudes of students approach toward English course based on puzzle-based learning. The scale consists of 28 items. As a result of basic component analysis, scale items were collected under one dimension. Kaiser-Meyer Olkin (KMO) value, which is used as a measure of sample adequacy in factor analysis, was found to be .96 for this

data set. The Cronbach's alpha coefficient of attitude scale toward English course developed by Erdem was found to be .97. In this study, Cronbach's alpha coefficient was re-calculated for pretest data as .88 and for posttest data as .89. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. In other words, the higher the score, the more reliable the generated scale is (Gliem & Gliem, 2003; Reynaldo & Santos, 1999). In this context, the values of the scale can be considered as a high reliability coefficient.

Self-Efficacy Belief Scale for English developed by Hancı Yanar and Bümen (2012) was used to measure the secondary school students' self-efficacy beliefs in English course based on puzzle-based learning approach. The scale consists of 34 items and four dimensions: Reading, writing, listening and speaking. Its KMO coefficient was found to be 0.97. Confirmatory factor analysis was performed to test that the scale was four-dimensional. Besides, the Cronbach's alpha coefficient of self-efficacy belief scale for English was calculated by Hancı Yanar and Bümen to be .97 for the whole scale. The coefficients of subscales were indicated to be .92 for reading, 0.88 for writing, 0.93 for listening, and 0.92 for speaking dimension. In this study, Cronbach's alpha coefficient was re-calculated for pretest data as .97 and for posttest data as .96. These values can be accepted as the indicator of high reliability.

A Semi-Structured Interview form was prepared by researchers to obtain data on the qualitative dimension of the research. In order to ensure the content, structure and language validities of the interview form, opinions of a specialist in Educational Sciences, a Turkish teacher and an English teacher were received. Feedbacks from experts were taken into consideration and some arrangements were made related to sentence structure of questions. The interview form consisted of five open-ended questions and through this form, students' opinions about the positive and negative aspects of puzzle-based learning approach were determined.

Unstructured Observation Form prepared by researchers was conducted in order to investigate students' behaviours during puzzle-based applications. The form was used in the experimental group where puzzle-based learning approach was applied. Unstructured observation is a method that gives the observer freedom to access and record information. It is done in natural environments where behaviour occurs and is often performed through participatory observation role in which researcher is involved (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2016; Yıldırım & Şimşek, 2013). On the observation form, there were blanks which were filled by the data about the date, time, name, theme of the course, and observation notes related to students' status, learning-teaching activities and students' attractions toward the course.

Data Collection Process and Analysis

For the students both in experimental and control groups, attitude scale toward English lesson and English self-efficacy belief scale were applied as pre-test and post-test. Dependent and independent groups t-test analyses were used during quantitative data analysis. The data of observations were collected during fifteen-week experimental procedure by taking notes on semi-structured forms and analysed by descriptive analysis. The findings determined from the observation data were presented as anecdotes. Besides, the data of interviews were obtained at the end of the study via face

to face interviews by writing students' answers on interview forms. Questions in the interview form were asked to 27 experimental group students. The duration of interview with each student lasted approximately fifteen minutes. The data of interviews were analysed by content analysis technique. The data were read word by word and codes were determined from interview data. For the reliability analysis of the data obtained by interview form, Miles and Huberman's (1994) reliability formula was used. The researcher and the expert came to agreement in 24 codes on interview forms while in 6 codes they experienced disagreement and they consulted on the codes in which the differences were determined. The disagreement was especially originated from technical and scientific labels of the codes (i.e. self-confidence, active participation, permanent learning, visual memory, thinking skill, speaking skill). At the end, final versions of the codes were agreed and presented in the tables. When the code numbers obtained were substituted in the formula, the reliability was calculated as .80. According to this value, interview data were accepted as reliable.

Findings

Findings Related to Experimental and Control Groups Students' Attitudes toward English Lesson and Their Self-Efficacy Beliefs in English

Findings of dependent groups t-test analysis related to experimental group students' pre-test and post-test scores of their attitudes toward English lesson are depicted in Table 1.

Table 1

Dependent Groups t-test Findings for Pre-test and Post-test Scores of Experimental Group Students' Attitudes toward English Lesson

Measuring	*N*	$\bar{X}$	*S*	*sd*	*t*	*p*
Pre-test	27	81.59	2.30	26	8.86	.000*
Post-test	27	108.74	9.60			

*p<.05

As seen in Table 1, puzzle-based learning approach led to a significant increase within experimental group students' attitudes toward English lesson, t(26)=8.86, p<.05.

Table 2 displayed the findings related to dependent groups t-test analysis for control group students' pre-test and post-test scores of their attitudes toward English lesson.

Table 2

Dependent Groups t-test Findings for Pre-test and Post-test Scores of Control Group Students' Attitudes toward English Lesson

Measuring	*N*	$\bar{X}$	*S*	*sd*	*t*	*p*
Pre-test	24	84.54	10.83	23	1.17	.251
Post-test	24	80.33	14.82			

As observed in Table 2, no significant difference was identified across pre-test and post-test scores of the control group students' attitudes toward English course, where English curriculum was applied, t(23) = 1.17, *p*>.05.

Findings of independent groups t-test analysis related to control group and experimental group students' post-test scores of their attitudes toward English lesson are presented in Table 3.

Table 3

Independent Groups t-test Findings for Post-test Scores of Experimental and Control Group Students' Attitudes toward English Lesson

Group	*N*	$\bar{X}$	*S*	*Sd*	*t*	*p*
Experimental	27	108.74	15.34	49	6.70	.000*
Control	24	80.33	14.82			

*p<.05

As shown in Table 3, independent groups t-test results regarding post-test scores of experimental and control groups students' attitudes toward English lessons revealed a significant difference in favor of experimental group, t(49)=6.70, *p*<.05.

Findings of dependent groups t-test analysis related to experimental group students' pre-test and post-test scores of their English self-efficacy beliefs are given in Table 4.

Table 4

Dependent Groups t-test Findings for Pre-test and Post-test Scores of Experimental Group Students' English Self-Efficacy Beliefs

Measuring	*N*	$\bar{X}$	*S*	*sd*	*t*	*p*
Pre-test	27	81.33	20.60	26	10.66	.000*
Post-test	27	109.88	25.62			

*p<.05

As seen in Table 4, puzzle-based learning approach caused a significant increase within experimental group students' English self-efficacy beliefs, t(26) = 10.66, *p*<.05.

Findings regarding dependent groups t-test analysis related to control group students' pre-test and post-test scores of their English self-efficacy beliefs are given in Table 5.

As seen in Table 5, there was found no significant difference between control group students' pre-test and post test scores of English self-efficacy beliefs, where English curriculum was applied, t(23) = 2.78, *p*>.05.

Table 5

Dependent Groups t-test Findings for Pre-test and Post-test Scores of Control Group Students' English Self-Efficacy Beliefs

Measuring	*N*	$\bar{X}$	*S*	*sd*	*t*	*p*
Pre-test	24	83.42	20.94	23	2.78	.086
Post-test	24	93.46	16.06			

Findings of independent groups t-test for control group and experimental group students' post-test scores of English self-efficacy beliefs are presented in Table 6.

Table 6

Independent Groups t-test Findings for Post-test Scores of Experimental and Control Group Students' English Self-Efficacy Beliefs

Group	*N*	$\bar{X}$	*S*	*Sd*	*t*	*p*
Experimental	24	93.46	21.05	49	2.48	.016*
Control	27	109.89	25.62			

*$p < .05$

Table 6 depicts t-test results of the independent groups regarding post-test scores of experimental and control groups students' English self-efficacy beliefs. Accordingly, a significant difference was determined in favor of experimental group, $t(49)=2.48$, $p<.05$.

Correlation analysis was carried out to determine whether there was a significant relationship between secondary school 8th grade students' attitudes toward English lesson and their English self-efficacy beliefs. the analysis results showed that there was a weak and positive correlation between students' attitudes toward English lesson and English self-efficacy beliefs according to *pre-test* results of students in *experimental group* (Pearson's $r=.24$, $p<.05$). On the other hand, according to *post-test* results of students in *experimental group*, there was a moderate and positive correlation between students' attitudes toward English lesson and English self-efficacy beliefs (Pearson's $r=.38$, $p<.05$). According to the *pre-test* results of *control group*, there was a weak correlation in opposite direction between their attitudes toward English lesson and English self-efficacy belief scores group (Pearson's $r=-.12$, $p<.05$). Finally, according to the *post-test* results of *control group*, there was found a positively weak correlation between the attitudes toward English lesson scores and English self- efficacy belief scores (Pearson's $r=.28$, $p<.05$).

Findings of Experimental Group Students' Opinions toward Puzzle-based Learning Approach

Students' answers to the question whether puzzle activities used in English lesson contribute to their learning are given in Table 7.

Table 7

Students' Answers Related to Contribution of Puzzles to Their Learning

Codes	*f*
Useful in learning	27
Vocabulary	17
Writing of words	15
Fun and instructive	10
Permanent learning	7
Interest to the lesson	4
Preparation for exams	3
Visual memory	3
Thinking skill	1

As seen in Table 7, all students (27/27) thought that puzzle activities used in their English lessons contributed their learning and these activities were useful. More than half of the students (17/27) expressed that puzzles improved their vocabulary. 15 of 27 students stated that they corrected their mistakes in writing of words thanks to puzzle activities and wrote them correctly. Nearly half of the students (10/27) found puzzle activities fun and instructive and expressed that they learned by having fun. Several of the students (7/27) stated that they learned especially words and phrases permanently thanks to puzzle activities. 4 of 27 students indicated that their interests to English lesson increased via puzzles. A small number of students (3/27) had the idea that puzzles prepared themselves for English exams to get high marks. 3 of 27 students stated that they strengthened their visual memories related to pictures at puzzle events and learned with the visuals of the words. Only 1 of 27 student said that puzzle events contributed to his/her thinking skills.

Some of the students' views on this subject are as follows:

> "I think puzzle activities are very useful because I can learn correct spelling of words thanks to these activities. It also helps me remember words I forgot."
>
> "Yes, I think it contributed, because in a lesson like English that requires repetition and memorization, the spelling and pronunciation of words must also be used correctly. Puzzle activities fit this framework exactly."
>
> "Yes, puzzle activities we do in English lesson contribute to us in many ways. In addition to learning the spelling of words, we can learn both their pronunciations and their meanings. Also, it has a lasting effect for us, which increases success."
>
> "Crossword puzzle activities have expanded my vocabulary knowledge. I learned both spelling and pronunciation of words better. I have learned to express a word by using other English words."

Table 8 gives answers related to students' interests and desires toward the lesson, their active participation, and their beliefs for success.

As can be seen in Table 8, a large majority (21/27) of students stated that puzzle activities in English classes had a positive effect on their active participation in English lessons. More than half of the students (16/27) stated that puzzle activities increased their beliefs for success in English. Some of the students (7/27) stated that puzzle

activities contributed for permanent learning and these activities were fun (6/27). 6 of 27 students had the idea that the activities were partially effective for them. Only a few students (4/27) stated that they actively participated in the class thanks to puzzle activities and they gained self-confidence by this way. A small number of students (3/27) declared the opinion that their desire for studying English lesson increased via puzzle activities.

Table 8

Students' Answers Related to the Effect of Puzzles on Their Interests, Desires, Active Participation, and Beliefs

Codes	*f*
Effective in active participation	21
Belief for success	16
Permanent learning	7
Fun	6
Partly effective in learning	6
Self-confidence	4
Desire for studying lesson	3

Some of the students' views on this subject are as follows:

> "In our English lesson, our teacher's puzzle activities increased my interest to the lesson. I also believe that I have improved myself positively in point of active participation during lessons."
>
> "Yes, it did because even if there is no information about a word in activities, I can complete the activity thanks to clues given and this increases my self-confidence by creating the idea that I can do it. Also, because I can learn words more easily thanks to puzzles, I am able to attend the lesson more than before. This makes me more successful both in lessons and in exams."
>
> "Actually, I'm interested in English lesson, but I can't ignore pluses that these puzzle activities add to us. I realized that my interest in lessons increased even more thanks to puzzle activities we did."

Students' answers about the necessity of puzzle activities in English lesson are given in Table 9.

As depicted in Table 9, all students (27/27) think that puzzle activities should take place in English lessons. More than half of the students (18/27) stated that puzzle activities helped them learn vocabulary. Nearly half of the students (12/27) declared that the activities were very fun. 9 of 27 students stated they learned vocabularies and phrases easily and permanently. A few of the students (4/27) believed that these activities were necessary for active participation. Few students (2/27) expressed puzzles were effective in preparing for exams and these activities should take place more frequently in English lessons. Only one student stated that puzzles improved speaking skill and another student thought that different types of puzzles should be applied.

Table 9

Students' Answers to the Necessity of Puzzle Activities in English Lesson

Codes	*f*
It should take part in lesson	27
Vocabulary learning	18
Fun	12
Permanent and easy learning	9
Active participation	4
Preparation for exams	2
Frequency of implementation of puzzles	2
Speaking skill	1
Different types of puzzles	1

Some of the students' views on this subject are as follows:

"I think puzzles should take place in English classes. Because I think such activities attract attention of those who cannot or do not like this course."

"In my opinion, puzzle activities are necessary for the course because first of all, the lessons are now more enjoyable and as students we can attend English lessons more than before. This situation increases our desires to learn. Secondly, when we do puzzle activity after learning words, it reinforces what we learn and this increases our course performance."

"From my point of view, puzzles should be in English lessons because English isn't composed of only some grammatical rules, in fact it is relevant to vocabulary knowledge. Through these puzzles, more words are learned. We can learn both spelling and the pronunciation of words and this increase my efficiency in the lesson."

The answers given by the students about the use of puzzle activities in the other lessons are given in Table 10.

Table 10

Students' Answers about Using Puzzle Activities in Other Lessons

Codes	*f*
It should be in other lessons	22
Instructive	14
Fun	7
Unnecessary	5
Concept learning	3

As seen in Table 10, majority of students (22/27) suggested that puzzle events should be included in other lessons. Nearly half of them (14/27) evaluated puzzles as instructive. Some of the students (7/27) thought that puzzles were entertaining during lessons. A few of the students (5/27) stated that puzzles were unnecessary for use in other lessons. On the other hand, few students (3/27) declared that puzzles should be used in learning of the concepts in other lessons.

Some of the students' views on this subject are as follows:

> "I would like to have puzzle activities in other classes because if we want to succeed, we need to learn concepts instead of memorizing them. Although there are many ways to learn well and effectively, I think one of the most enjoyable and easiest ways is puzzle activities".
>
> "I don't think puzzles are necessary for all courses, especially for numerical courses. We used it effectively in English because it was very useful in learning words and expressions, but I don't think it is very useful for math class."
>
> "In my view, puzzles should be used in other lessons. For instance, using puzzles in Revolution History and Kemalism lesson can enable us to learn the concepts about lesson better and lessons can be more enjoyable."

Findings Regarding Observations of Experimental Group Students During the Application of Puzzle-Based Learning Approach

The highlighted qualitative findings of observations in experimental group through 15-week period are as follows:

- It was observed that interaction of students with their friends and teacher increased during lessons when puzzle activities were used.
- It was seen that students communicated with their friends and teacher especially when they suffered about writing of words during puzzle activities.
- During the activities, the teacher was generally in a guiding and directing position and tried to answer students' questions.
- It was observed that students had fun with the use of puzzles in lesson. Also they enjoyed puzzle activities when they did in their spare time.
- There was a considerable rise in students' interests to lessons. It was observed even students who were irrelevant and less interested in course in which regular curriculum was used were actively trying to make puzzles during puzzle activities.
- As students completed puzzles, they realized that they could learn more words easily and they wanted more puzzle activities to attend lessons more actively.
- The relaxed and fun classroom environment that occurred when puzzle events were practiced sometimes caused a slight increase in noise level.
- During the solutions of puzzles, there was an intense desire about participating to the activities.

Results, Discussion and Suggestions

The research results are presented as follows:

- Puzzle-based learning approach in English language class increased students' attitudes toward English lesson positively within the group.
- English curriculum had no effect on the students' attitudes toward English lesson within the group.
- Puzzle-based learning approach was more effective about increasing students' attitudes toward English lesson than English curriculum.
- Puzzle-based learning approach in English language class increased students' English self-efficacy beliefs within the group positively.
- English curriculum did not affect students' self-efficacy beliefs within the group.
- Puzzle-based learning approach was more effective about increasing students' English self-efficacy beliefs than English curriculum.

- As students' attitudes toward English lesson in experimental group increased, students' English self-efficacy beliefs also increased. Also, this correlation increased after the study compared to beginning of the study. However, before the study, as the level of control group students' attitudes toward English increased, their English self-efficacy beliefs decreased. On the other hand, after the study, control group students' self-efficacy beliefs in English increased as their attitudes toward English increased.
- According to students' views, the use of puzzle-based learning approach in English course had positive effect. In this context, puzzle-based learning had a positive influence in improving students' general English language skills and their writing skills in English, in correcting mistakes they made in writing, in making classroom environment fun and instructive, in increasing student's lesson awareness, in strengthening students' visual memories, in increasing students' beliefs in achievement, their self-confidence and desire to study.
- Students' ideas indicated that puzzle activities should take place both in English classes and in other lessons, because it had positive effects on the formation of a fun classroom environment, students could learn new words easily and permanently, it could ensure active participation of students during lessons.
- As a result of observations, which were made in experimental group during the implementation process, students were found to learn by having fun and their active participation during lessons increased. Also, the implementation constituted an intense interaction among students in learning process.

The research results revealed that puzzle-based learning approach increased students' attitudes toward English lesson positively. Similar to the results of this research, Crossman and Crossman's (1983) study showed that puzzles provided an amusing teaching environment, developed authenticity, benefited students' learning, and increased interest in study habits. Based on this result, puzzles used in classroom environments can be fun, supportive and motivating to participate and they can attract attention of the student to the lesson and subject so student can have a behavioral attitude willing to perform the puzzle activity. Similarly, Franklin et al. (2003) indicated that puzzles created fun learning environment. Besides, Yang and Lau (2003) stated that free choice of English courses at the university helped students to obtain the language needed for career and personal development, and they also realized how important it was to have a positive attitude toward the use of English. Accordingly, Songur (2006) revealed that lessons with puzzle activities made easier for students to remember vocabularies, affected students' attitudes toward English lesson positively and increased students' success. At that point, individuals can continue to participate in puzzle activities because they have fun while doing it and it can be thought that this situation will allow students to have positive attitudes toward the course. Weisskirch (2006) drew the conclusion that puzzles had made learning process more interesting and they were more effective time when students were working together. Baş (2009) studied students' attitudes toward English course in which brain-based learning method was applied and concluded that it was more beneficial than the course applied with traditional teaching methods. Similarly, in this study, students in experimental group, in which puzzle based learning method was applied, had higher attitudes toward the English course than the students in the other group. Correspondingly, Kılıç (2009) stated that the use of creative

drama method in foreign language classes positively influenced students' attitudes toward speaking in English. In a study that measured the effect of imagination activities on the success, interest and attitudes of university students toward English courses, Doğru (2014) found out imagination activities had a statistically significant effect on the success and interest level of the imagination activities but there was no significant effect of the imagination activities on the attitude. In this context, the result of this study contradicts the results of our research. Similar to the results of this study, Kartal (2014) concluded that the application of cooperative learning method improved students' attitudes toward English course positively. Also, Akın (2016) came to the conclusion that there was a positive development in the attitude and reflective thinking levels of the experimental group students who applied the drama method.

Another research result suggested that puzzle based learning approach had a positive effect on students' self-efficacy beliefs. Self-efficacy belief is accepted as an important variable on students' various behaviors. Michalewicz & Michalewicz (2008) argued that the characteristics of the puzzle-based learning approach had a facilitating role in learning, and that students could work in small collaborative learning groups and that they were able to perform desired behaviors. Based on this, it can be said that in the context of puzzle-based learning approach, English lessons containing educational puzzles can increase the belief that an individual can achieve the objectives of the course and increase self-efficacy perception of the student. Tılfarlıoğlu and Cinkara (2009) emphasized the importance of students' self-efficacies in language learning process. It was seen that the results of these two studies were similar, considering that the use of puzzles in English lessons increased self-efficacy beliefs of students. Similarly, Motlagh, Amrai, Yazdani, Abderahim, and Souri (2011) declared that self-efficacy perception was an important factor in academic achievement. Yusuf (2011) revealed that self-efficacy beliefs significantly increased learning achievement. Meral, Çolak, and Zereyak (2012) found that students' self-efficacies significantly affected their academic achievements. Furthermore, in Meral, Çolak, and Zereyak's (2012) study it was concluded that students who had high self-efficacy perception were more active in English, their attendance was high, permanent learning was achieved, and beliefs in achieving English were increased. In present study it came to the conclusion that, puzzle-based learning approach had a positive effect on students' self-efficacy beliefs in English. Parallelly, Başaran (2010) indicated that podcasts had positive effects on some language learning judgments and self-efficacy beliefs. This result was similar to the study showing that puzzle based learning approach had a significant difference when compared to the teaching environments where usual English language curriculum was used in terms of the effects to students' self-efficacy beliefs. Also, Raoofi et al. (2012) stated that various factors such as the use of strategy, students' interests and experiences increased their self-efficacy levels. In Çolak's (2013) study conducted to examine the effect of communication activities on self-efficacy beliefs in English lessons, it was observed that participants' self-efficacy beliefs in communicating in English increased.

In the study, all the students in experimental group indicated that puzzle-based learning approach was an effective method of learning English in terms of different aspects. Similar results emerged in the relevant studies: Akkan (2005) concluded that puzzle activities were more effective than traditional methods. Also, Baş (2010) found a significant difference in favor of experimental group in which learning strategies

teaching was applied. Merrick (2010) found that synthesis of puzzle-based learning concepts with existing course content increased students' learning experiences, interests to lesson, and participation in lectures. Additionally, Gürdal and Arslan (2011) stated that puzzle types such as square puzzles, spiral puzzles, word hunting, word placement, picture puzzles, pyramid puzzles, and picture square puzzles increased students' knowledge and enabled them to learn by doing. Similar to this study, Aslan (2012) used puzzles in Republic of Turkey History of Revolution and Ataturkism lesson and stated that because of abundance of abstract concepts, direct instruction technique bothered students during lessons and so the activities which students could take active role such as puzzles, should be applied. Correspondingly, Kaymakçı (2012) had come to the conclusion that students were usually more active in solving puzzles and having fun while learning. Öztürk et al. (2013) concluded that puzzle-based learning had attracted learners, made the lesson fun, and increased student participation. Besides, Kestha and Al-Faalet (2013) found the necessity of implementing puzzle-based learning method in English teaching by shedding light on the achievements of students and on techniques that emphasized organizing information for long-term learning.

As a supportive result for students' ideas indicating positive effect of puzzles on vocabulary learning, Vossoughi and Zargar (2009) indicated that word puzzles affected students' vocabulary development process positively. Bouteliaten (2010) had come to the conclusion that students learned almost all of the words which they didn't know by using puzzles in foreign language classes. Similarly, in this study's result students indicated they were especially aware of the fact that puzzles played an important role in development of their vocabulary knowledge. Similar to this study, Orawiwatnakul (2013) stated that puzzles helped students acquire vocabulary knowledge. As a result of Sholikhah (2011) study, it was revealed that the use of puzzle activities was effective in learning common words. Furthermore, Njoroge et al. (2013) concluded that the use of puzzles in teaching English as a second language was an effective strategy of teaching vocabulary and helped students expand their vocabulary knowledge. It was a complex process to learn the meanings and pronunciations of words in foreign languages and rules of spelling (Nagy & Scott, 2000). Therefore, it can be said that the applied approach was effective in contributing to students' vocabulary learning.

Based on the results of this study, the following suggestions are presented for practical and research purposes:

- It was shown in a qualitative context that the program prepared by puzzle-based learning approach had positive effects on creating fun classroom environment, providing active participation of the students, enhancing the belief in achievement and providing permanent learning in the students. Besides, this approach enhanced the students' attitudes and self-efficacy beliefs. For this reason, puzzle-based learning-based activities may be used in other lessons by teachers for similar effects.
- In interviews with students, the students were determined to be willing to do puzzle activities in lessons. Thus, the puzzle-based activities may be used for increasing their willingness toward the lesson.
- This research may be considered as the first that was applied in English lesson in Turkey in reachable literature. For this reason, the results of future studies may be comparable to those of present study.

- This research was conducted in 8th grade English course in the units "Cooking, The Communication, The Internet, Adventures". Similar research can be designed for other units and subjects of English lesson.
- In present study, the effects of the puzzle-based learning approach on the students' attitudes and self-efficacy beliefs were measured. In another study, the effect of this learning approach on academic achievement can be measured.

References

Akkan, E. (2005). Matematik öğretiminde bulmaca etkinliğinin öğrenci başarısına etkisi. *Burdur Eğitim Fakültesi Dergisi, 6*(10), 140-146.

Akın, A. (2016). *Yabancı dil öğretiminde yaratıcı drama yöntemi kullanımının lise 12. sınıf öğrencilerinin eleştirel, yansıtıcı düşünme becerilerine ve öğrencilerin yabancı dil öğrenme tutumlarına etkisi* (Yüksek Lisans Tezi). Adnan Menderes Üniversitesi, Sosyal Bilimler Enstitüsü, Aydın.

Alemi, M. (2010). Educational games as a vehicle to teaching vocabulary. *Modern Journal of Applied Linguistics (MJAL), 2*(6), 425-438.

Anaydubalu, C. C. (2010). Self-Efficacy, anxiety, and performance in English language among middle-school students in English language program in Satri Si Suriyothai School, Bangkok. *International Journal of Human and Social Sciences, 5*(3), 193-198.

Aslan, S. (2012). *8. sınıf T.C. İnkılap Tarihi ve Atatürkçülük dersi kavramlarının öğretiminde bulmacaların öğrenci başarısına etkisi* (Yüksek Lisans Tezi). Mehmet Akif Ersoy Üniversitesi, Eğitim Bilimleri Enstitüsü, Burdur.

Atkinson, D. (2003). L2 writing in the post-process era: Introduction. *Journal of the Second Language Writing, 12*(1), 3-15.

Avcı, H. (2015). *İngilizce öğretiminde istasyon tekniği kullanımının akademik başarıya, tutumlara ve kalıcılığa etkisi* (Yüksek Lisans Tezi). Fırat Üniversitesi, Eğitim Bilimleri Enstitüsü, Elazığ.

Aydemir, E. (2012). *Çevrimiçi bulmaca kullanımının öğrencilerin akademik başarısına ve öğrenmenin kalıcılığına etkisi* (Yüksek Lisans Tezi). Fırat Üniversitesi, Eğitim Bilimleri Enstitüsü, Elazığ.

Aziza, B. (2013). *The role of using crossword puzzles as teaching strategy to enhance students' vocabulary*. Master thesis, Mohamed Khider University of Biskra Department of Foreign Languages, Biskra.

Baş, G. (2009). İngilizce dersinde işbirlikli öğrenme yönteminin öğrencilerin erişisi, derse karşı tutumlarına ve öğrenilenlerin kalıcılığına etkisi. *Milli Eğitim, 184*, 240-256.

Baş, G. (2010). Beyin temelli öğrenme yönteminin ingilizce dersinde öğrencilerin erişilerine ve derse yönelik tutumlarına etkisi. *İlköğretim Online, 9*(2), 488-507.

Başaran, S. (2010). *Podkestlerin üniversite birinci sınıfta okuyan türk öğrencilerin dil öğrenme yargıları ve öz-yeterlik algıları üzerindeki etkileri* (Doktora Tezi). Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü, Adana.

Bouteliaten, A. (2010). *The effectiveness of using crossword puzzles as a teaching strategy to enhance students' knowledge of vocabulary: The case of 1st year students, University of Constantine* (Master Thesis). Mentouri University-Constantine Faculty of Letters and Languages Department of Languages, Constantine.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2016). *Bilimsel araştırma yöntemleri* (22. Baskı). Ankara: Pegem Akademi.

Chen, Y. H., Lin, C. P., Looi, C. K., Shao, Y. J., & Chan, T. W. (2012). A collaborative cross number puzzle game to enhance elementary students' arithmetic skills. *Turkish Online Journal of Educational Technology - TOJET, 11*(2), 1-14.

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research design. In A. Tashakkori and C. Teddlie (Eds.), *Handbook of mixed methods in the behavioral and social research* (pp. 209-240). California: SAGE Publications Inc.

Crossman, E. K., & Crossman, S. M. (1983). The crossword puzzle as a teaching tool. *Teaching of Psychology, 10*(2), 98-99.

Çimen, S. (2011). *Eğitim fakültesi öğrencilerinin İngilizceye yönelik tutum, İngilizce kaygısı ve öz yeterlik düzeylerinin incelenmesi* (Yüksek Lisans Tezi). Karaelmas Üniversitesi, Sosyal Bilimler Enstitüsü, Zonguldak.

Çolak, C. (2013). *Sanal dünyalarda düzenlenen İngilizce iletişim kurma etkinliklerinin öğretmen adaylarının öz-yeterlik inancına ve sosyal bulunuşluklarına etkisi* (Yüksek Lisans Tezi). Karadeniz Teknik Üniversitesi, Eğitim Bilimleri Enstitüsü, Trabzon.

Çubukçu, F. (2008). Yabancı dil öğrenme endişesi ile öz yeterlik arasındaki korelâsyon üzerine bir çalışma. *Eğitimde Kuram ve Uygulama, 4*(1), 148-158.

Danesi, M. (2004). *The puzzle instinct: The meaning of puzzles in human life*. Bloomington: Indiana University Press.

Doğru, E. (2014*). Hayal aktivitelerinin üniversite öğrencilerinin ingilizce derslerine yönelik başarı, ilgi ve tutumları üzerindeki etkisi* (Yüksek Lisans Tezi). Abant İzzet Baysal Üniversitesi, Eğitim Bilimleri Enstitüsü, Bolu.

Erdem, D. (2007). İngilizce dersine yönelik bir tutum ölçeği çalışması. *Eurasian Journal of Educational Research, 28*, 45-54.

Fadel, M. R. (2005). *Storytelling and vocabulary acquisition at the elementary level.* Unpublished magister thesis, Mentouri University, Constantine.

Franklin, S., Peat, M., & Lewis, A. (2003). Non-traditional interventions to stimulate discussion: The use of games and puzzles. *Journal of Biological Education, 37*(2), 79-84.

Gliem J. A., & Gliem R. R. (2003) *Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales.* 2003 Midwest Research to Practice Conference in Adult, Continuing, and Community Education, Columbus, 82-88.

Gömleksiz, M. N., & Kılınç, H. H. (2014). Lise 12. sınıf öğrencilerinin ingilizce öz yeterlik inançlarına ilişkin görüşleri. *Fırat Üniversitesi Sosyal Bilimler Dergisi, 24*(2), 46-60.

Gürdal, A., & Arslan, M. (2011). *Oyun ve bulmaca etkinlikleriyle yabancılara Türkçe kelime öğretim yöntemi*. 1st International Conference on Foreign Language Teaching and Applied Linguistics, Sarajevo.

Hancı Yanar, B., & Bümen, N. (2012). İngilizce ile ilgili öz-yeterlik inancı ölçeğinin geliştirilmesi. *Kastamonu Eğitim Dergisi, 20*(1), 97-110.

Huang, S., & Shanmao, C. (1996). *Self-efficacy of English as a second language learner: An example of four learners.* Bloomington, IN: Language Education

Department, School of Education, Indiana University. (ERIC Document Reproduction Service No. ED 396536).

Kartal, Ş. (2014). *İşbirlikli öğrenme yönteminin öğrencilerin ingilizce dersine yönelik tutumlarına ve başarılarına etkileri* (Doktora Tezi). İnönü Üniversitesi, Eğitim Bilimleri Enstitüsü, Malatya.

Kaymakçı, S. (2012). Sosyal bilgiler dersinde bulmaca kullanıyorum. *Araştırma Temelli Etkinlik Dergisi (ATED), 2*(2), 86-99.

Kestha, A. S., & Al-Faalet, F. K. (2013). The effectiveness of using puzzles in developing Palestinian tenth graders' vocabulary achievement and retention. *Humanities and Social Sciences, 1*(1), 46-57.

Kılıç, Ş. (2009). *Yaratıcı dramanın İngilizce konuşmaya ve tutuma etkisi* (Yüksek Lisans Tezi). Abant İzzet Baysal Üniversitesi, Sosyal Bilimler Enstitüsü, Bolu.

Kızıl, Ö. (2015). *Sosyal bilgiler 6. sınıf "Ülkemizin Kaynakları" ünitesinin kavram bulmacası etkinlikleri yoluyla öğretiminin akademik başarı üzerindeki etkisi* (Yüksek Lisans Tezi). Celal Bayar Üniversitesi, Sosyal Bilimler Enstitüsü, Manisa.

Memduhoğlu, H. B., & Çelik, Ş. N. (2015). İngilizce öğretmen adayı olan ve İngilizce öğretmeni olmayı planlayan üniversite öğrencilerinin ingilizce öz-yeterlik algıları. *İnönü Üniversitesi Eğitim Fakültesi Dergisi, 16*(2), 17-32.

Meral, M., Çolak, E., & Zereyak, E. (2012). The relationship between self-efficacy and academic performance. *Social and Behavioral Sciences, 46,* 1143-1146.

Merrick, K. E. (2010). An empirical evaluation of puzzle-based learning as an interest approach for teaching introductory computer science. *IEEE Transactions on Education, 53*(4), 677-680.

Meyer, E. F., Falkner, N., Sooriamurthi, R., & Michalewicz, Z. (2014). *Guide to teaching puzzle-based learning.* London: Springer-Verlag.

Michalewicz, Z., & Michalewicz, M. (2008). Puzzle-based learning: an introduction to crıtical thinking, mathematics and problem solving. *Teaching Mathematics and Computer Science, 6*(2), 415-420.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* London: Sage Publications.

Motlagh, S. H., Amrai, K., Yazdani M. J., Abderahim, H. A., & Souri, H. (2011). The relationship between self-efficacy and academic achievement in high school students. *Social and Behavioral Sciences, 15,* 765-768.

Nagy, W. E., & Scott, J. A. (2000). Vocabulary processes, In M. Kamil, P. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of Reading Research: Volume III* (pp. 269-284). New York: Longman.

Namlı, Ş. (2016). *Sudoku, futoshiki ve kakuro bulmacalarının 8. sınıf öğrencilerinin denklemler ve eşitsizlikler konusundaki başarılarına etkisi* (Yüksek Lisans Tezi). Akdeniz Üniversitesi, Eğitim Bilimleri Enstitüsü, Antalya.

Nassar, E. (2009). *Impact of using puzzles in development of critical thinking in mathematics and the tendency toward it of the basic fourth graders in Gaza* (Master Thesis). Islamic University, Gaza.

Njoroge, M. C., Ndung'u, R. W., & Gathigia, M. G. (2013). The use of crossword puzzles as a vocabulary learning strategy: A case of English as second language in Kenyan secondary school. *International Journal of Current Research, 5*(1), 313-321.

Orawiwatnakul, W. (2013). Crossword puzzles as a learning tool for vocabulary development. *Electronic Journal of Research in Educational Psychology, 11*(2), 413-428.

Öztürk, E., & Gök, S. (2015). Etkinlik örnekleriyle güncel öğrenme–öğretme yaklaşımları. Gülay Ekici (Ed.), *Bulmaca temelli öğrenme-öğretme yaklaşımı* (27-60). Ankara: Pegem Akademi.

Öztürk, E., Gök, S., & Takımcıgil, S. (2013). Bulmaca temelli öğrenme. *Sakarya Üniversitesi Eğitim Fakültesi Dergisi, 26*, 48-63.

Raoofi, S., Tan, B. H., & Chan, S. H. (2012). Self-efficacy in second/foreign language learning contexts. *English Language Teaching, 5*(11), 60-73.

Reynaldo, J. A., & Santos, A. (1999). Cronbach's alpha: A tool for assessing the reliability of scales. *Journal of Extension, 37*, 1-4.

Sholikhah, A. (2011). *The effectiveness of word find puzzle to teach common noun for 5th grades of elementary school* (Degree of Bachelor of Education). Tarbiyah Faculty Walisongo State Institute for Islamic Studies, Semarang.

Slavin, R, E. (2003). *Educational psychology: Theory and practice.* Boston: Pearson Education.

Songur, A. (2006). *Harfli ifadeler ve denklemler konusunun oyun ve bulmacalarla öğrenilmesinin öğrencilerin matematik başarı düzeylerine etkisi* (Yüksek Lisans Tezi). Marmara Üniversitesi, Eğitim Bilimleri Enstitüsü, İstanbul.

Şahin, C. (2016). *Hikâyelerle desteklenmiş yabancı dil öğretiminin 5 ve 8. sınıflar düzeylerinde kelime dağarcığı, okuduğunu anlama ve yabancı dile karşı tutumuna etkisi* (Yüksek Lisans Tezi). Ahi Evran Üniversitesi, Sosyal Bilimler Enstitüsü, Kırşehir.

Tılfarlıoğlu, F. T., & Cinkara, E. (2009). Self-efficacy in EFL: Differences among proficiency groups and relationshıp with success. *Research on Youth and Language, 3*(2), 129-142.

Vaishnav, H. (2015). Learning a language -en route puzzles and games. *International Journal of English Language, Literature and Humanities, 3*(3), 550-559.

Vossoughi, H., & Zargar, M. (2009). Using word-search-puzzle games for improving vocabulary knowledge of Iranian EFL learners. *Journal of Teaching English as a Foreign Language and Literature of Islamic Azad University of Iran, 1*(1), 79-85.

Weisskirch, R. (2006). An analysis of instructor-created crossword puzzles for student review. *College Teaching, 54*(1), 198-201.

Yang, A., & Lau, L. (2003). Students attitudes to the learning of English at secondary and tertiary school. *System, 31*(1), 107-123.

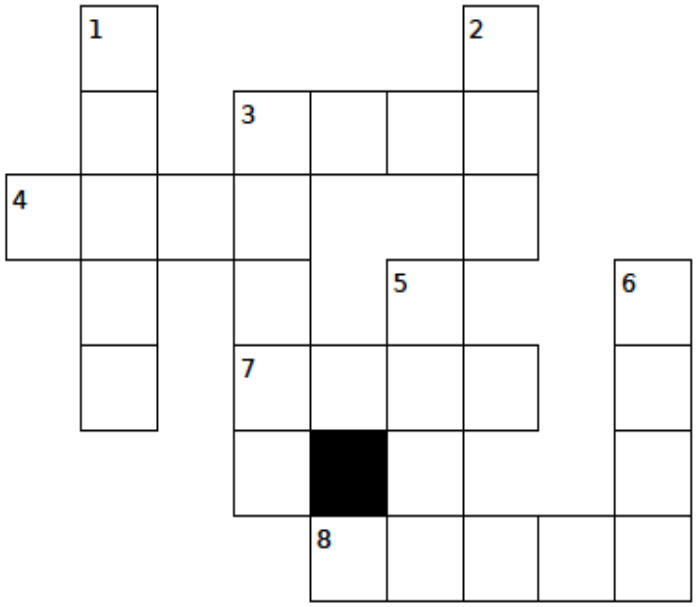
Yangın Ersanlı, C. (2015). The relationship between students' academic self-efficacy and language learning motivation: A study of 8th graders. *Social and Behavioral Sciencies, 3,* 473-488.

Yıldırım, A., & Şimşek, H. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri.* Ankara: Seçkin Yayıncılık.

Yusuf, M. (2011). The impact of self-efficacy, achievement motivation, and self-regulated learning strategies on students' academic achievement. *Social and Behavioral Sciences, 15,* 2623–2626.

Appendix

Cooking Crossword Puzzle - 1



Down:

1. to prepare (dough) by pressing a mixture of flour, water, etc., with your hands
2. to cook something quickly in oil on the top of the oven
3. to cut something into thin pieces
5. to put something in quickly in a large quantity
6. to cook something in hot water

Across:

3. to move something around with a spoon
4. to take the skin of a fruit or vegetable
7. to cut something into pieces with a knife
8. to put something close to very strong direct heat

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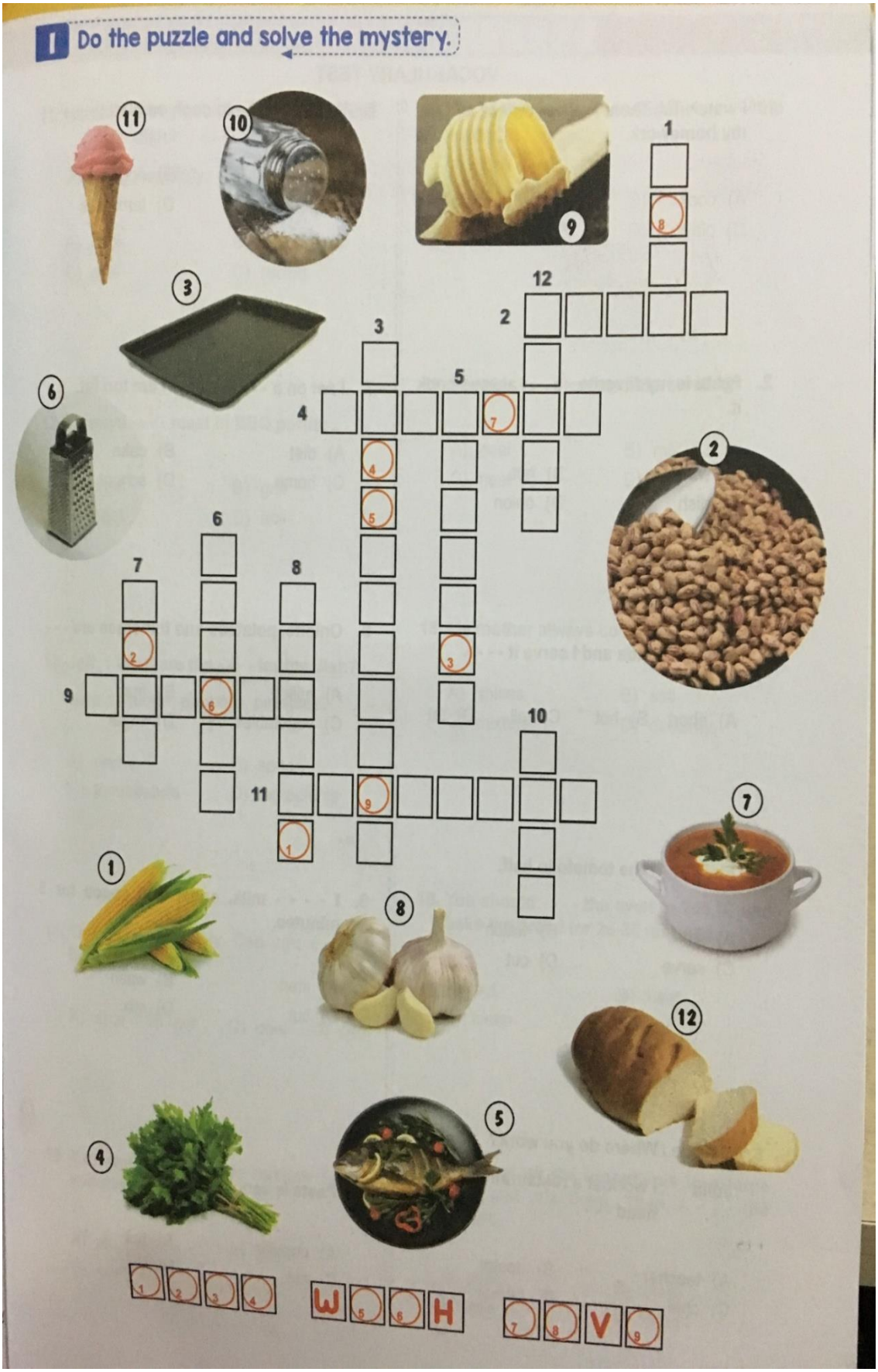
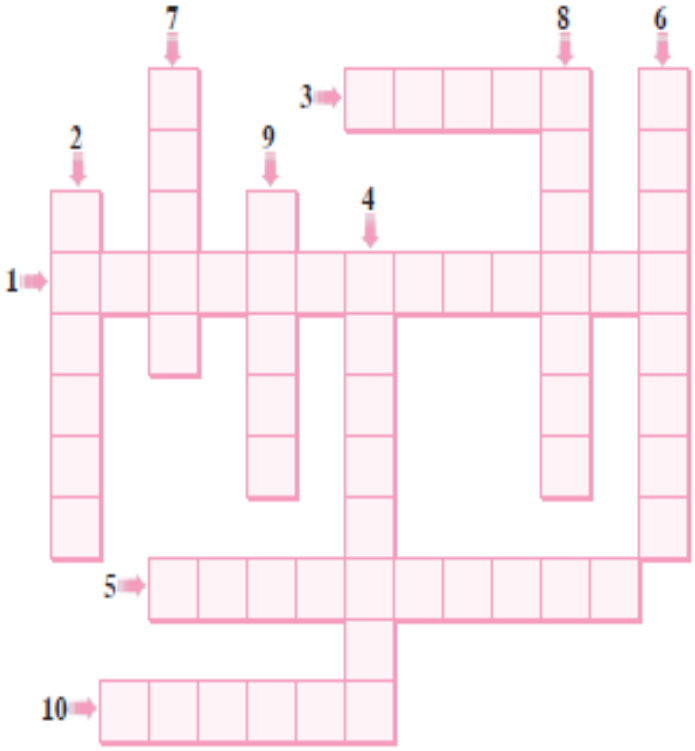

I Do the puzzle and solve the mystery.
W
H
V

Across

1. a writing system using picture symbols
3. the main ways that people receive information and entertainment
5. giving and receiving
10. very special or unusual

Down

2. very large animals that live in the sea
4. the system of words or signs that people use to express thoughts and feelings to each other
6. You ask someone, argue with someone or give reasons to someone when you cause that person to do something.
7. When something bad or unfair happens, you have this strong feeling.
8. very old
9. funny stories



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